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Cement

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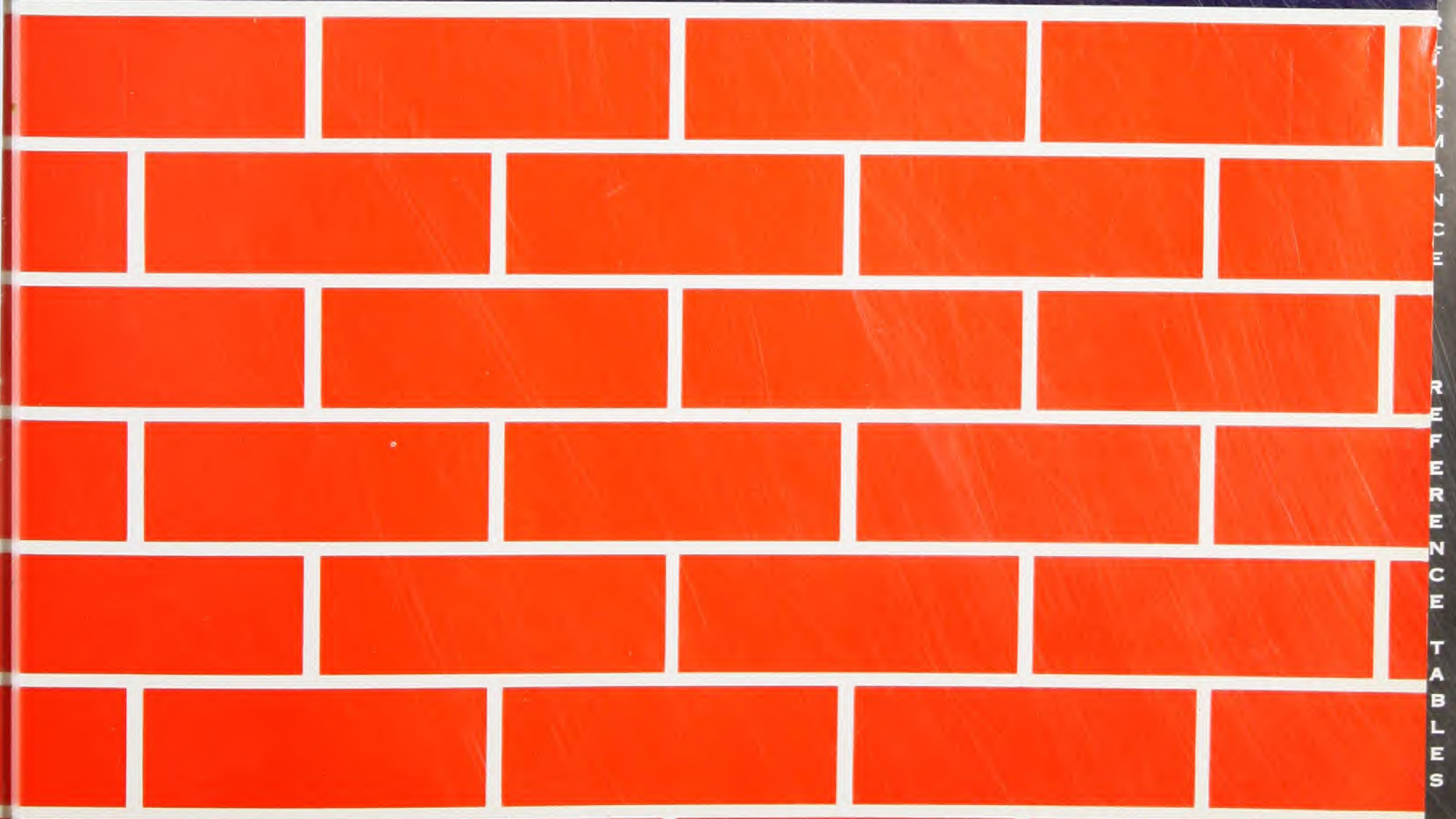
LONE STAR

masonry

CEMENT



USEFUL INFORMATION FOR ARCHITECTS, ENGINEERS AND MASONRY CONTRACTORS.





● **QUALITY AND ECONOMY:** Produced to exacting standards, under rigid laboratory control at every stage of manufacture, Lone Star Masonry Cement greatly simplifies the problem of obtaining uniformly high-quality mortar. One ready-to-use cementing material instead of two means one less variable in proportioning, and one less material to handle on the job. No addition of lime or Portland Cement is necessary—soaking or slaking is eliminated. Economy, coupled with durable, weather-resistant performance, explains the widespread use of Lone Star Masonry Cement for all kinds of masonry work, on structures large and small.

THE \$9.5-MILLION, 10 story, 500-bed Veterans Administration Hospital, New Orleans, in which 5,293 barrels of **LONE STAR MASONRY CEMENT** were used in laying up all brick, block and stone—typical of the widespread use of this high-quality mortar cement in large-scale construction.

JAYHAWK JUNIOR MOTEL, attractive, ranch-type structure, operated by the owners of The Jayhawk, Topeka's leading hotel—pleasing example of attractive, durable masonry construction with **LONE STAR MASONRY CEMENT** in all types of walls—brick, stone, concrete block, tile, glass block, stucco.



I THE ECONOMIC VALUE OF GOOD MASONRY CEMENT

- Good design, good workmanship and good materials are the requisites of quality masonry construction. Other things being equal, the quality of the mortar is a decisive factor in assuring durable, weathertight masonry of lasting beauty.

Attractive, durable structures the country over show that for many years quality mortars have been obtained with mixes of Portland cement and lime. This reflects seasoned experience at the mixing box and craftsmanship on the scaffold.

But it is equally true that the quality of cement-lime mortar varies with the quality of the materials used and with the degree of skill and experience that go into the propor-

tioning and mixing with water of three different materials—Portland cement, lime and sand.

This emphasizes an important advantage of LONE STAR MASONRY CEMENT, which only has to be mixed with sand and water. With one cementing material instead of two, there is one less variable in proportioning, which helps assure quality mortar of utmost uniformity.

From the standpoint of labor costs, this factory-produced, ready-to-use masonry cement means one less material to handle on the job.

Paralleling a study of problems in the field with work in the cement laboratory, it has been possible to incorporate in LONE STAR MASONRY CEMENT the combination of prop-



CHEMICAL SOUNDNESS is of utmost importance as a safeguard against expansion. The autoclave test, part of regular quality control procedure in the manufacture of LONE STAR MASONRY CEMENT, reveals in a matter of hours any volume change due to chemical unsoundness that might only take place after years of exposure.

Left, placing bars of LONE STAR MASONRY CEMENT in the autoclave, where they are subjected for 3 hours to superheated steam at a temperature of 420° F. and a pressure of 310 psi. Right, measuring bars for expansion.

Autoclave expansion of LONE STAR MASONRY CEMENT is always below 0.5%, assuring the long-time soundness of mortar made with this cement.

erties desired by the Architect, the Mason and the Owner:

1. High water retention, assuring excellent workability, plasticity and bond;
2. Adequate strength;
3. Soundness—no delayed expansion;
4. Low absorption and high water repellency, an assurance of durability and a safeguard against unsightly efflorescence;
5. Low shrinkage.

A Standard of Excellence

Through outstanding performance, the name Lone Star has become synonymous with high quality and uniformity in all types of Portland cements, and this family attribute applies to LONE STAR MASONRY CEMENT—the modern cement specially designed to produce quality mortar for laying up brick and block and for all purposes where lime-cement mortars have been used.

This booklet provides factual information on the properties of LONE STAR MASONRY CEMENT and places in the hands of the Architect, Engineer and Mason convenient information which will be found an important aid to quality masonry construction.



HIGH WATER RETENTION is essential for workability, plasticity and bond. This standard test for water retention simulates the sucking action of brick or block. Suction is applied to mortar for one minute. The difference in the flow of the mortar, before and after the suction test, indicates the plasticity and water retention. Standard mortar specifications require that the flow after suction be not less than 70% of the flow before suction is applied.

II

ANALYSIS OF PROPERTIES ASSURING HIGHEST-QUALITY MASONRY MORTAR

- In a masonry mortar, the Architect is interested in obtaining a watertight joint, good bond, low shrinkage and no expansion, in a mortar free from salts as protection against efflorescence.

The Mason wants a plastic, workable mix that is buttery and smooth-spreading—with good yield and minimum droppage, one that assures economical, high-speed performance.

The Owner wants a watertight and an attractive wall that resists moisture penetration.

The properties built into Lone Star Masonry Cement provide the strongest possible assurance of satisfaction in meeting all these requirements.

A.S.T.M. Specification C 91 and Federal Specification SS-C-181 set minimum requirements for masonry cements—Type I intended for mortar above grade and not exposed to frost action, and Type II for general use in masonry construction,

even under the severest exposure conditions.

In each specification the requirements for Type I and Type II are identical except for strength. When tested in accordance with the specifications the strength must be as follows:

Age	Compressive Strength minimum psi	
	Type I	Type II
7 days	250	500
28 days	500	1000

Lone Star Masonry Cement at all times exceeds the requirements of the Type II Specification, and hence automatically exceeds all requirements for Type I.

The specifications also cover such normal Portland cement properties as fineness, setting time, strength, soundness and air entrainment, as well



THROUGHOUT THE MANUFACTURING PROCESS, continuous samples are taken from the mill stream for test. Part of this system of rigid quality control is the standard test for strength. No shipment leaves a Lone Star mill unless it passes all standard tests and in addition meets our own self-imposed quality standards.



IN ADDITION to standard strength tests, the Lone Star Cement Research Laboratory conducts continuing studies of mortar properties, including bond. The test illustrated above is part of the investigation of various factors such as consistency, mix proportions and plasticity, as they affect bond.

as water retention, absorption and water repellency, which properties apply specifically to masonry cements.

Lone Star Masonry Cement—What It Is

Lone Star Masonry Cement consists of scientifically determined proportions of Portland cement and limestone very finely inter-ground, with special plasticizing and air-entraining agents added during the grinding process. Accurate control throughout manufacture assures a masonry cement of highest quality, uniform from batch to batch and job to job.

Plasticity and Workability

Plasticity and workability are essential in assuring quality and economy in masonry work and play an important part in the strength, appearance and resistance to the passage of water in the finished work.

It is for this reason that Lone Star Masonry Cement is specifically formulated to impart extra smoothness and workability to the mortar. Lone Star Masonry Cement mortars have a plasticity which is in every way comparable to that of the best cement-lime putty mixes.

Lone Star Masonry Cement produces an extra-fat mortar that spreads easily into long mortar beds, works smoothly under the trowel, with maximum speed and minimum effort. A bag of Lone Star Masonry Cement (70 lbs., or 1 cu. ft.) will readily carry three full cubic feet of sand, in a mortar which makes it easy to shove brick or block accurately into place, assuring neat, economical work.

Water Retention

Masonry mortar is used with units having a wide range of suction; some are very porous, with high absorption, while others are relatively impervious. The ability of a mortar to prevent

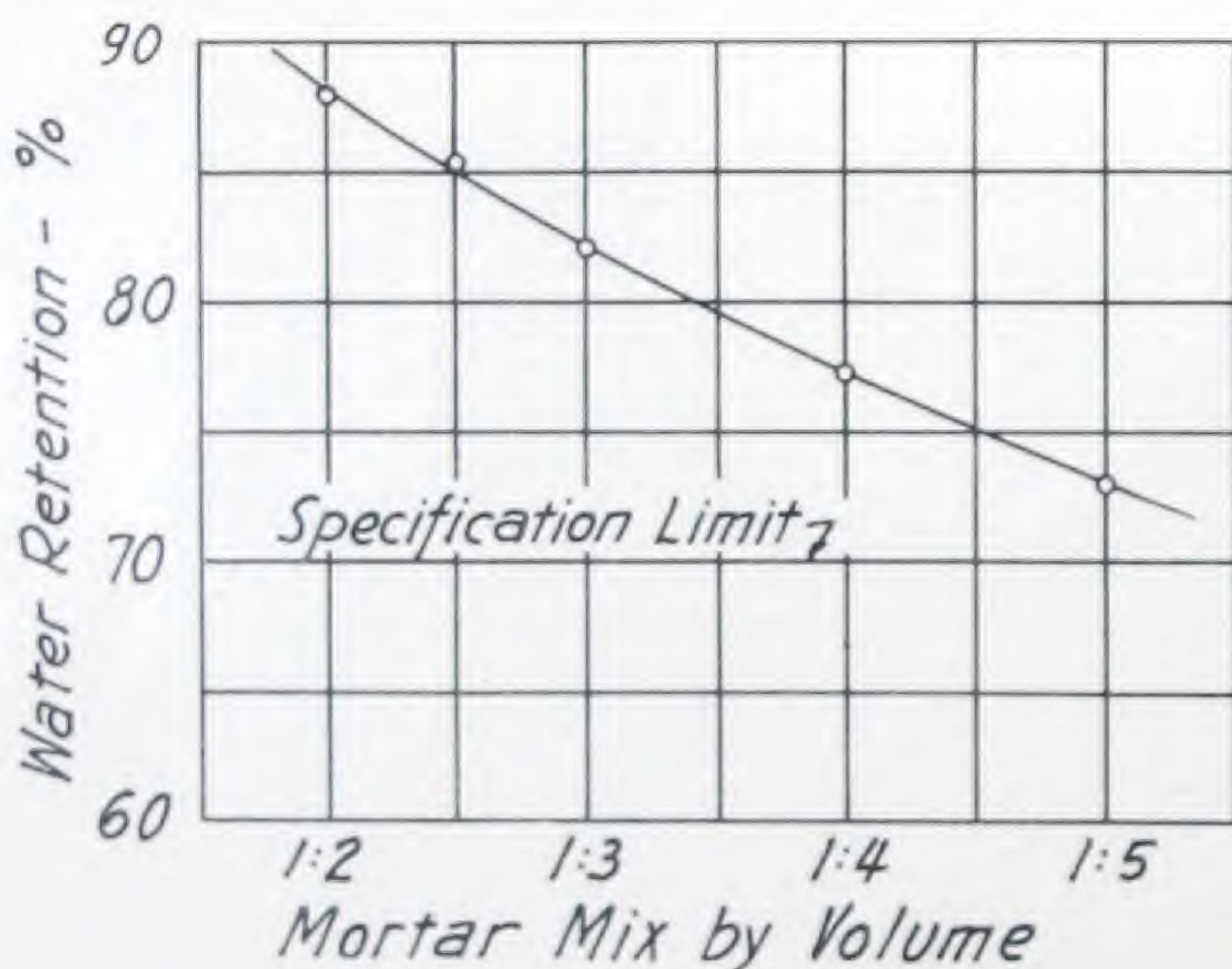


Fig. 1: EFFECT OF MIX PROPORTIONS ON WATER RETENTION. Each water retention value represents an average of 10 tests with Lone Star Masonry Cement (2 samples each from 5 Lone Star mills), in mortars with commercial sand. All mortars were made to the same consistency—110% flow on standard flow table. As the graph shows, the richer the mix, the better its water retention. Note high water retention of the recommended 1:3 mix, but even the lean 1:5 mix had better than 70% water retention, indicating the high sand-carrying capacity of Lone Star Masonry Cement.

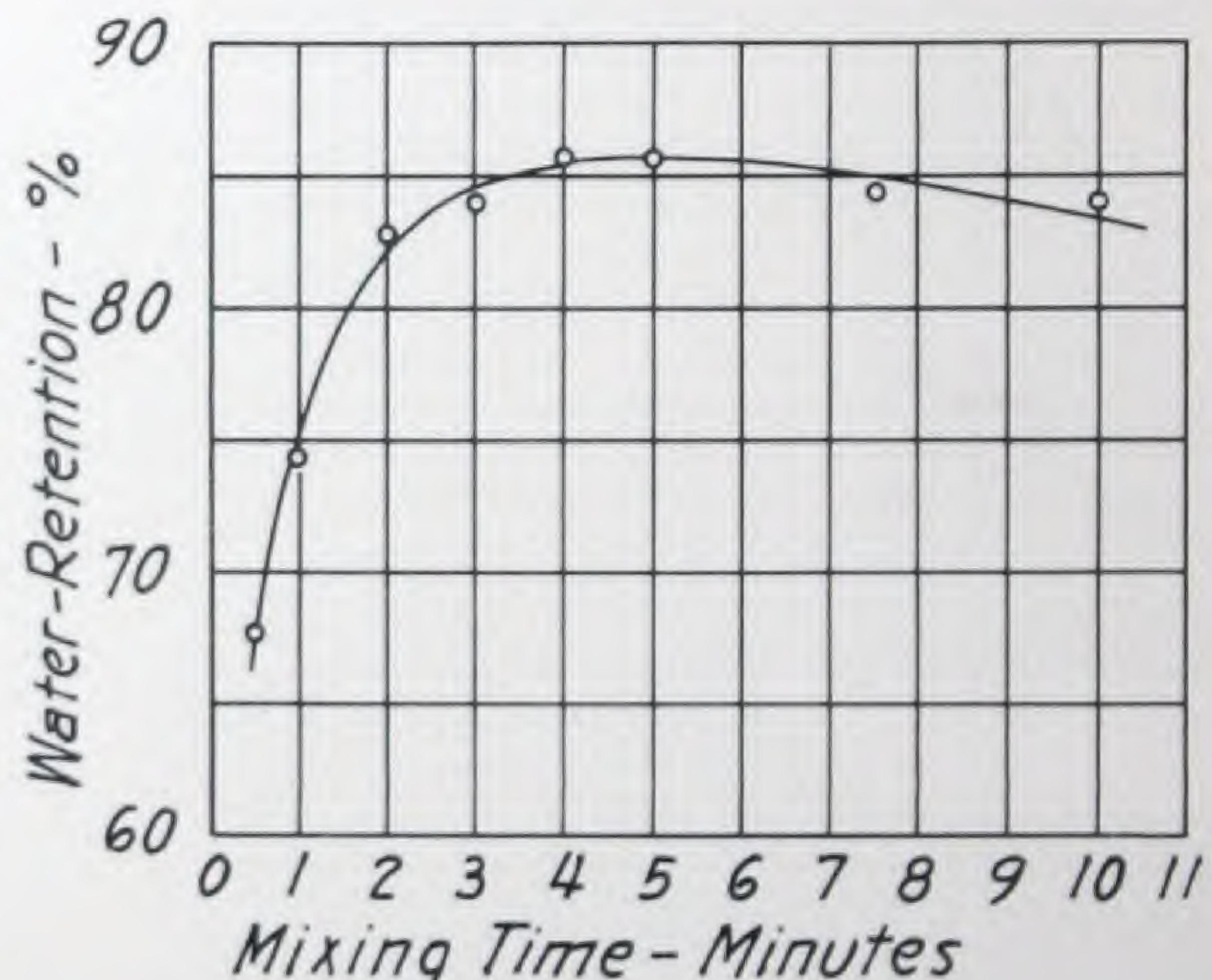


Fig. 2: EFFECT OF MIXING TIME ON WATER RETENTION. Water retention was determined on the recommended mix of one part Lone Star Masonry Cement to 3 parts sand by volume, with mixing time of mortar batches ranging from $\frac{1}{2}$ minute to 10 minutes. Each value represents an average of 5 tests. Water retention and plasticity improved rapidly during the first 2 minutes of mixing, reaching a maximum after about 4 minutes. These tests show the importance of thorough mixing in obtaining mortar of maximum plasticity. Thorough mixing also improves yield.

rapid loss of water to highly absorptive units and prevent bleeding when used with impervious units is one of the most important properties of a good masonry mortar. Because it affects the bond between mortar and masonry units, water retention has an important effect upon watertightness and durability.

Lone Star Masonry mortars have unusually high water-retaining capacity; hence, the mortar remains plastic, so brick or block can be properly bedded and good bond obtained.

Fig. 1 shows how water retention and plasticity are affected by mix proportions. The recommended 1:3 mix has excellent water retention.

Fig. 2 shows the effect of mixing time upon water retention and plasticity.

Thorough mixing is necessary to fully develop the plastic properties of any mortar. In these tests, mixing beyond three minutes produced no additional benefit, while mixing less than one minute

resulted in a mortar very deficient in water retention.

Adhesion and Bond

Permanent bond is of course the primary requisite in a strong, watertight wall, and Lone Star Masonry Cement contributes importantly to this end.

Hardening is timed to permit deep penetration and keying into the porous structure of brick or block. Exceptional constancy of volume means that the bond, once formed, is of maximum durability.

Strength

The strength of Lone Star Masonry Cement is at all times above the specification limits for Type II masonry cement. The strength of mortar depends upon mix proportions and the amount of water used per bag of cement.

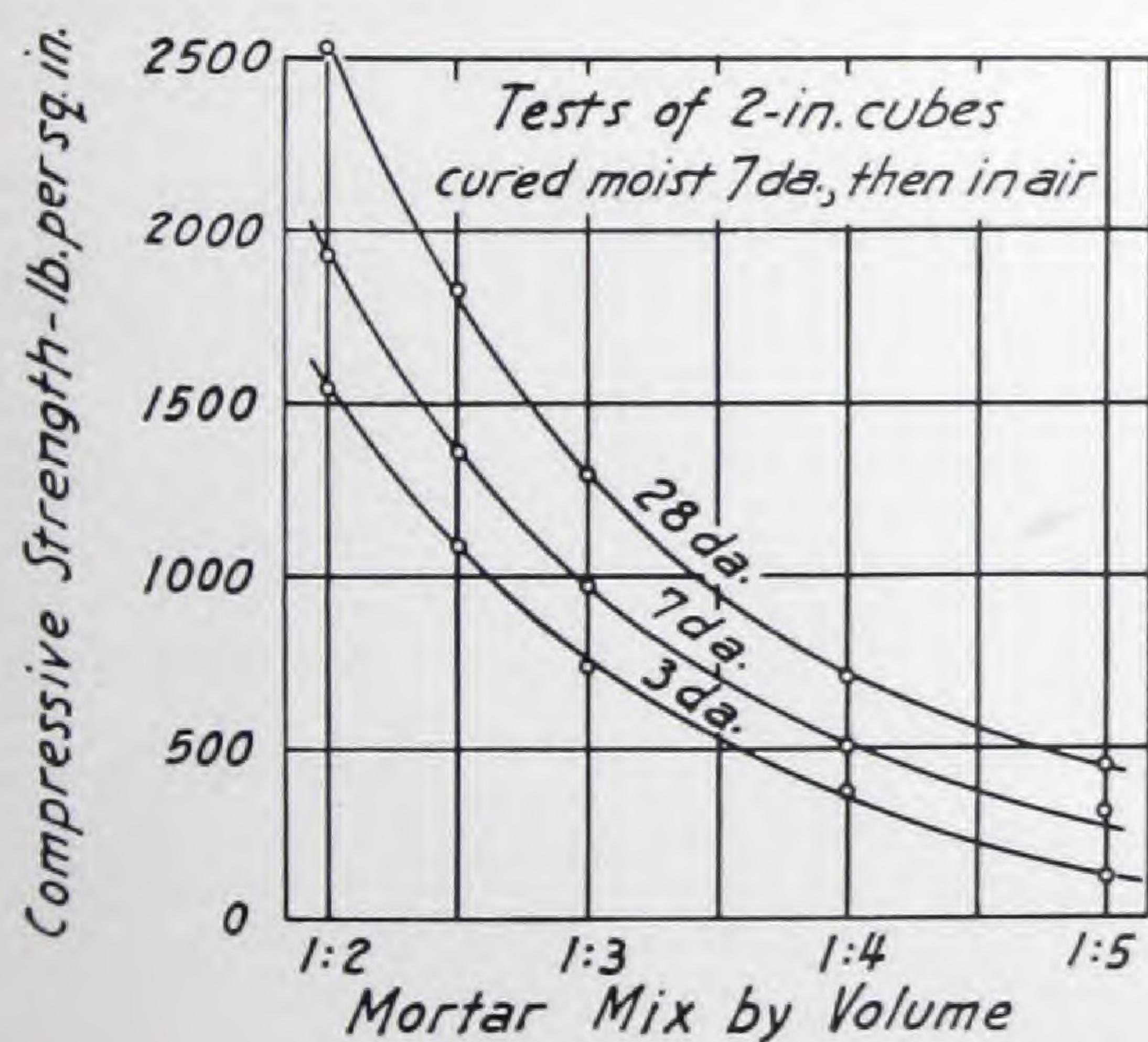


Fig. 3: EFFECT OF MIX PROPORTIONS ON STRENGTH OF MORTAR.
Compression tests of 2" mortar cubes, moist cured for 7 days, then in air, with Lone Star Masonry mortar mixes of 1:2 to 1:5 by volume. Commercial masonry sand was used in mortars. Each value represents an average of 30 tests. The strength of a mortar depends on mix proportions or cement content. The 1:2 mix had a 28-day compressive strength of about 2500 psi, as compared to approximately 450 psi for the 1:5 mix. Careful proportioning is necessary to obtain uniform results.

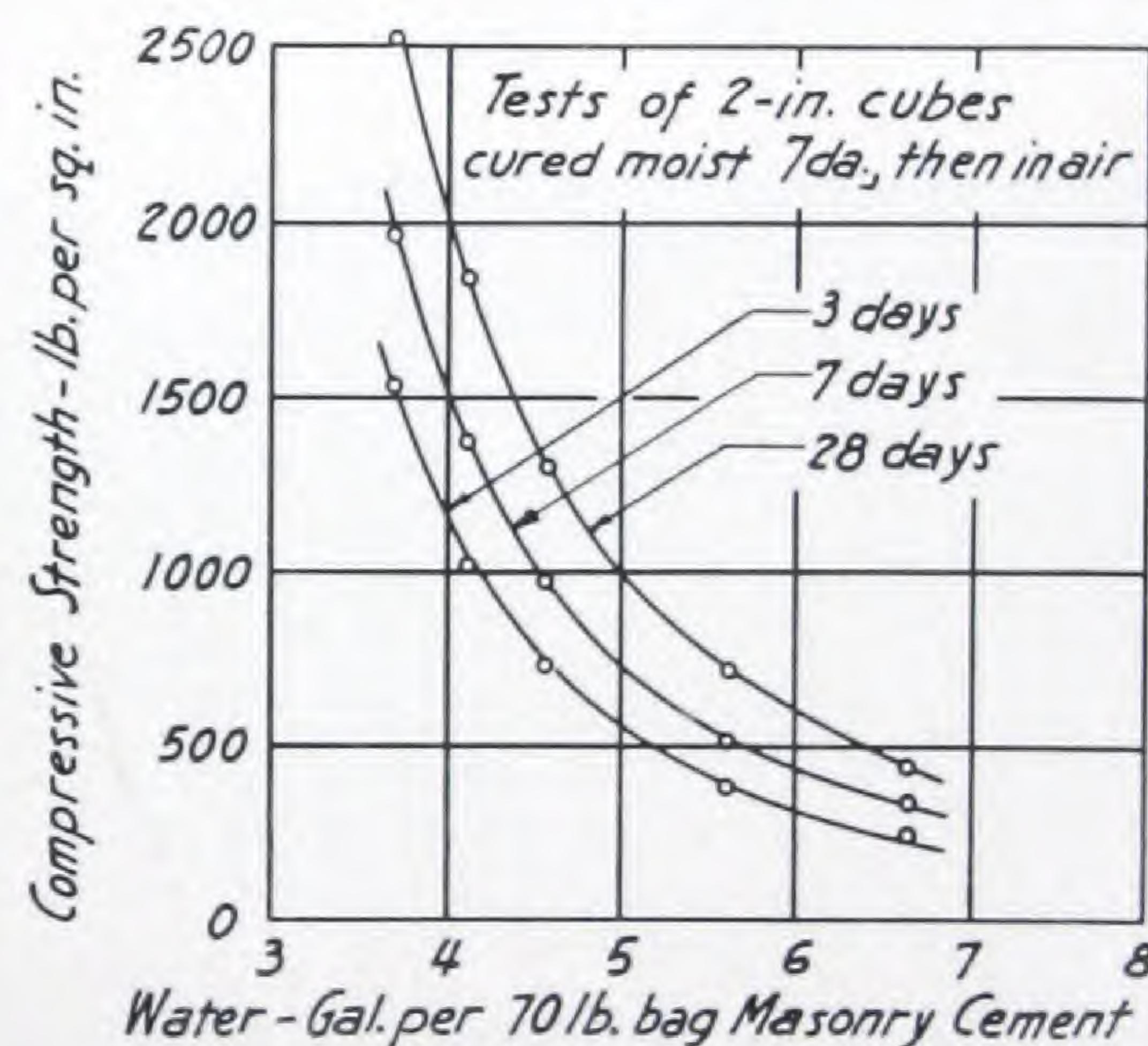


Fig. 4: EFFECT OF WATER CONTENT ON STRENGTH OF MORTAR. The amount of water used per bag of Masonry Cement determines the strength of the mortar. Typical relations between strengths and water per bag cement are shown in Fig. 4, with each value representing average of 30 tests. The richer mixes are stronger because they require less water per bag of cement.

Mix by volume	1:2	1:2½	1:3	1:4	1:5
Water gal./bag	3.7	4.1	4.6	5.6	6.7

Fig. 3 shows the effect of mix proportions on strength, at 3, 7 and 28 days. Fig. 4 gives typical water cement ratio—strength relation. It will be noted that, depending upon mix proportions, 28-day strengths ranging from 500 to 2500 psi can be obtained.

The strength of a 1:3 Lone Star Masonry mortar is more than adequate for general masonry construction — foundations, load-bearing and parapet walls, or for stacks — without the further addition of Portland cement or admixture of any kind.

Durability

Durability is of special importance in providing long-time protection against exposure to the elements. Lone Star Masonry Cement produces a durable mortar. Its air-entraining properties assure high resistance to alternate freezing and thawing.

Inherent water repellency and low absorption characteristics prevent joints from becoming saturated, protecting against destructive weathering action.

With Lone Star Masonry Cement, no additional waterproofing material is necessary. The

chemical soundness of this cement is a safeguard against expansion of mortar joints.

Walls built with Lone Star Masonry Cement mortar are strong and durable, providing sound protection against the costly expense of repointing, and retain their attractive appearance through the years.

Fig. 5 shows results of standard absorption tests on mortar mixes ranging from 1:2 to 1:5. These tests show that absorption of Lone Star Masonry mortars is very low after submersion in water, which indicates high resistance to moisture penetration.

Non-Efflorescent

Efflorescence can only occur when soluble salts are present in the materials used in masonry work, and water in sufficient quantity is present to carry the salts to the surface, where they are deposited upon evaporation of the water.

Lone Star Masonry Cement, being practically free from salts, is not a factor in efflorescence. Moreover, low water absorption and high water repellency of this mortar serve to restrain the leaching out of any salts that may be present in the sand or brick.

Thus, while it cannot be said that the use of



TWO TYPES OF TESTS are used to check for efflorescence. In a test suggested by the Public Housing Authority (illustrated at left) brick known to be free of salts are placed in pulverized mortar mixed with an excess of distilled water and carefully observed for appearance of efflorescence.

In the test, illustrated at right, two bricks separated by a mortar joint of Lone Star Masonry mortar were placed in a



solution of 5% sodium carbonate, to check the effectiveness of the mortar joint as a barrier against passage of salts from brick to brick. Brick in this test had an absorption of 21%. Even though the joints were not tooled, the mortar joint effectively barred the passage of moisture and prevented the spread of efflorescence.

Lone Star Masonry Cement is a guarantee against efflorescence, it *can* be said that its use is a big factor in minimizing the possibility of this expensive annoyance.

Color

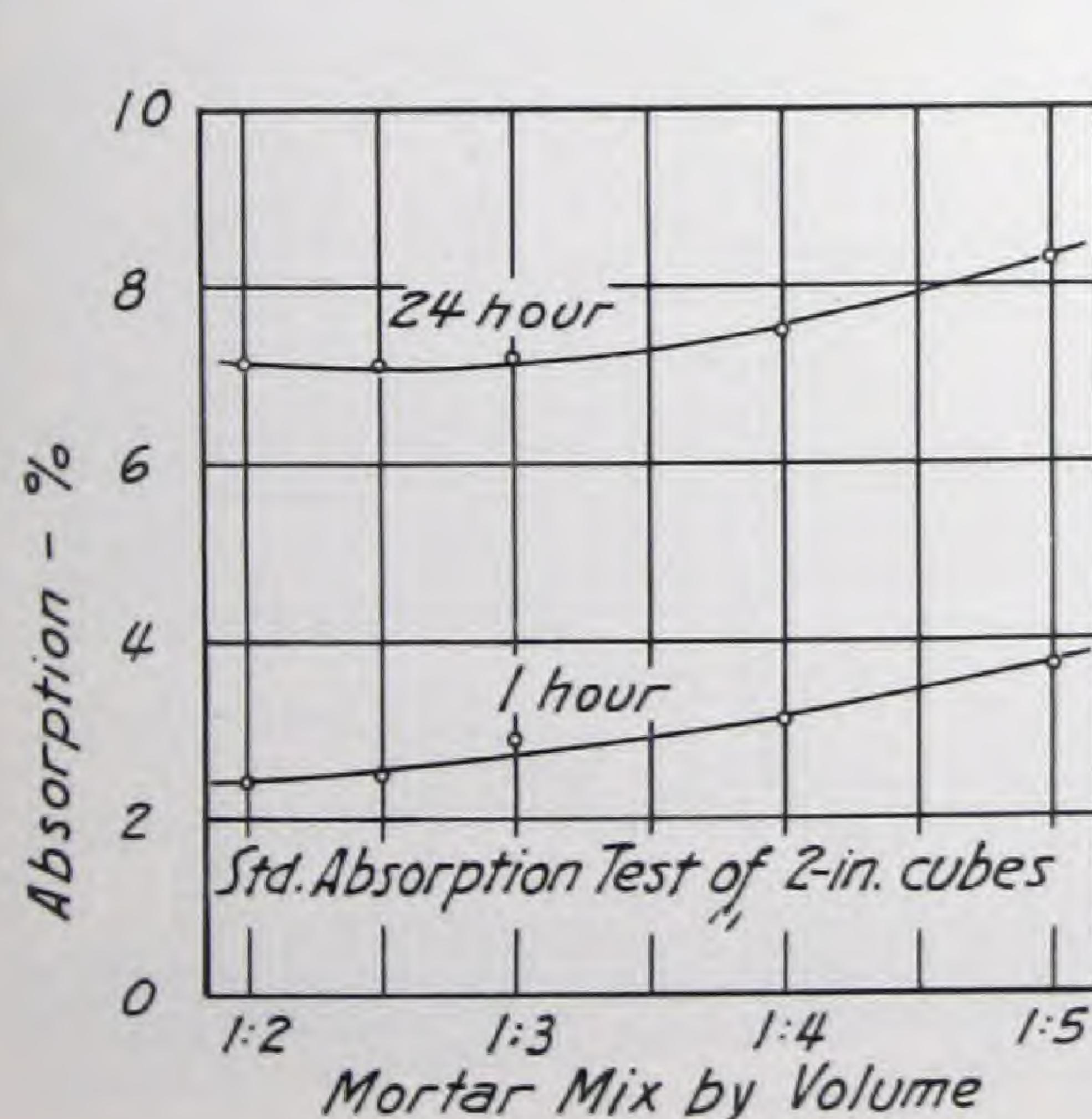
Rigid control during the manufacture of Lone Star Masonry Cement assures a uniform, pleasing color. In this connection, it should be borne in mind that the color of masonry mortar will vary with the color of the sand used.

Special color effects can be obtained by the addition of high-grade, lime-fast, mineral-oxide pigments. The low water absorption and density of Lone Star Masonry mortars help retain the desired color effect.

Proportioning

The amount of sand per bag of cement affects the quality of the mortar. The relationship between mix proportions, strength and water retention is shown in Figs. 1 and 3.

The recommended proportion of one bag (1 cu. ft.) of Lone Star Masonry Cement to 3 cu. ft. of sand will produce a mortar of excellent workability and adequate strength. However, it may be necessary to adjust these proportions to take care of variations in sand and brick. Proportion-



ing of sand by weight is an aid to uniform quality and maintained yield throughout the job, because variations in moisture content have considerably less effect than variations in volume due to bulking.

Sand

Aggregate for masonry mortar consists of natural sand or manufactured sand. Some sands are better suited than others. The use of clean, well-graded sand makes it possible to take full advantage of the properties of Lone Star Masonry Cement.

To assure economical masonry work of high quality, sand should comply with the requirements of A.S.T.M. Specification C 144, the principal provisions of which are as follows:

Grading

Sieve Size	<u>Percent Passing</u>	
	Natural Sand	Manufactured Sand
No. 4	100	100
No. 8	95 to 100	95 to 100
No. 16	60 to 100	60 to 100
No. 30	35 to 70	35 to 70
No. 50	15 to 35	20 to 40
No. 100	2 to 15	10 to 25
No. 200	0 to 10

Deleterious substances shall not exceed the following amounts:

<u>Item</u>	<u>Maximum Permissible Percentage by Weight</u>
Clay lumps	1.0
Lightweight particles, floating on liquid having a specific gravity of 2.0	0.5

Organic materials shall not be present in injurious amounts. When sand is tested for organic

Fig. 5: EFFECT OF MIX PROPORTIONS ON ABSORPTION. Two-inch cubes, made in accordance with Federal Specifications SS-C-181, were cured moist for 7 days, then oven dried for 24 hours. After cooling, they were weighed and immersed in $\frac{1}{4}$ " of water, then re-weighed after 1 hour and 24 hours immersion and absorption determined. Each value shown is an average of 30 tests. Low absorption gives a good indication of the ability of a mortar to resist the weathering action of the elements. Absorption increases as the mix becomes leaner.

impurities and produces a color darker than the standard it shall be rejected.

Water

Any water fit to drink can be used in mixing the mortar. Use of alkaline waters or the addition of salts may cause efflorescence. The amount of water should of course be varied according to the type of brick used. At all times, use enough water to produce a workable mortar of the proper cohesiveness and spreading quality.

Mixing

In hand mixing, the first step is to mix the cement and the sand until the mixture has a uniform color. Then slowly add water, and hoe from end to end of the mortar box, until a workable consistency is obtained.

In machine mixing, pour about one-half of the total mixing water into the mixer, then follow with the sand and cement. Add enough water to provide the required consistency.

Mix the entire batch for from two to four minutes. Thorough mixing is necessary to obtain maximum workability and yield and to assure a uniformly colored batch.

Yield

Lone Star Masonry Cement has a high sand-carrying capacity. For a given mix proportion, the yield of mortar per bag of cement depends upon the characteristics of the sand and thoroughness of mixing. When a satisfactory mix is obtained, measure the sand accurately to maintain

exact proportions and assure uniform and constant yield throughout the job.

Reminders

In hot, dry or windy weather, when mortar tends to dry out, keep the mortar covered as much as possible; dampen highly absorptive units before use.

In cold weather, protect the work against freezing until mortar is properly hardened. Units should be free from frost. Maintain the temperature of water and sand at about 70 degrees.

One final point: It takes first-class workmanship, along with good design and good materials, to produce sound, weather-proof masonry work. Most masons are highly skilled and have a keen sense of pride in their craft, and the special properties of Lone Star Masonry Cement assure them of a mortar which makes possible quality work with efficient job speed.



LOW ABSORPTION is essential as an assurance against weathering action. The absorption of hardened mortar is determined in accordance with Federal Specification SS-C-181. Cubes are placed in a drying oven at a temperature of 220° F. for 20 to 24 hours and then weighed. The cubes are then placed in water for one hour and for 24 hours. After removal, they are again weighed to determine absorption, providing a good indication of the ability of the mortar to keep out moisture.

III

PERFORMANCE of Lone Star Masonry Cement

Covers the Entire Range of Masonry Work

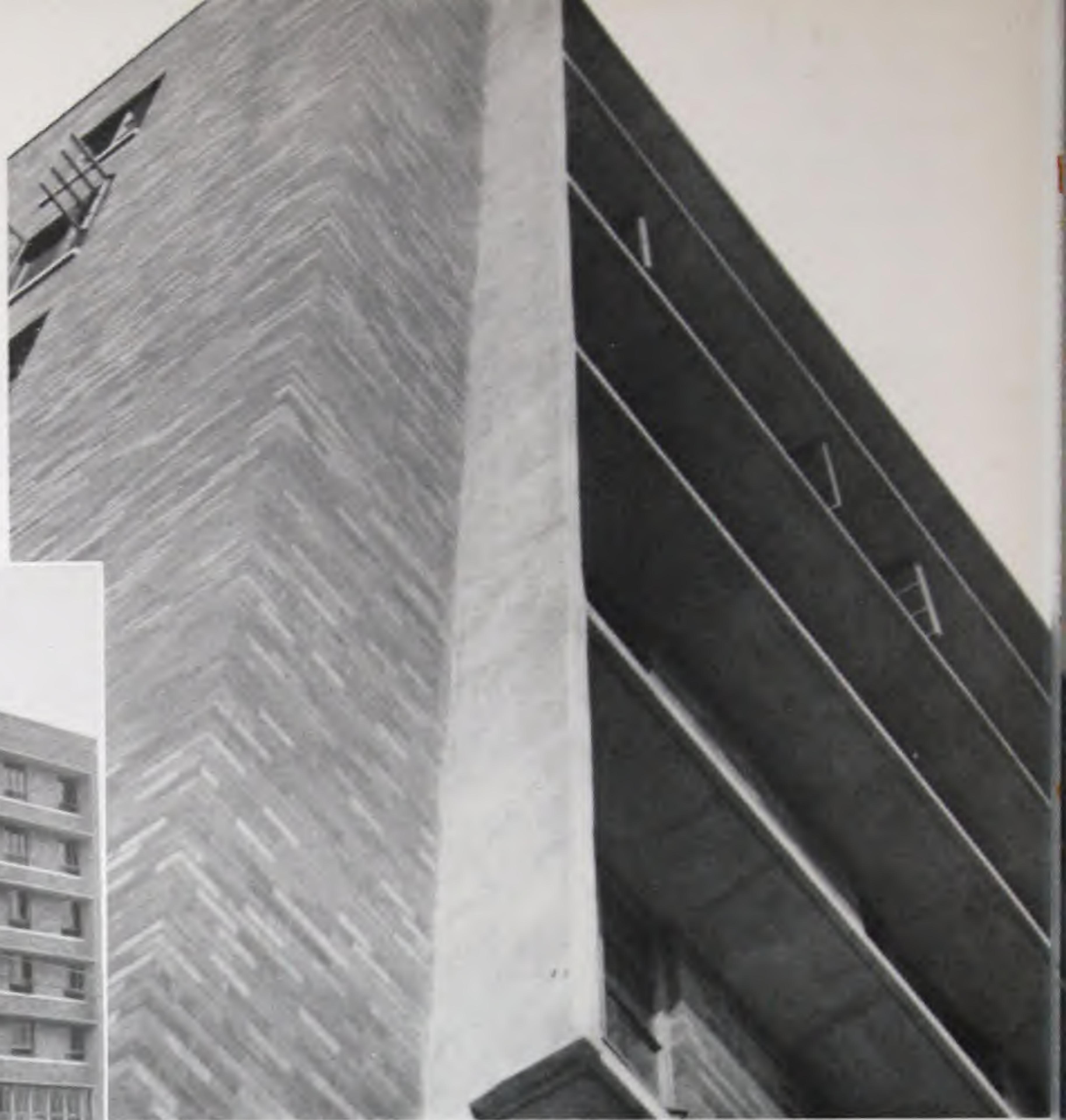
- Representative of the wide use of Lone Star Masonry Cement for clean, strong, weathertight walls in structures of all types are the attractive, well-designed buildings shown on this and following pages. This all-purpose mortar cement fits the most exacting requirements of the entire range of masonry work.



IN THE PHYSICS LABORATORY (below) of SYLVANIA ELECTRIC PRODUCTS, INC., Bayside, L. I., glazed-brick walls pleasantly punctuated by clean-cut joints clearly speak of the artisan working with quality materials. Public appreciation of this handsome building was expressed by a Prize Award for excellence in design and construction. Illustrating widespread repeated use based on satisfaction of Owner, Architect and Contractor, Lone Star Masonry Cement was later used on Sylvania's new Metallurgy Laboratories Building, shown above.



ATTRACTIVE, WEATHERTIGHT WALLS laid up with Lone Star Masonry Cement enhance the appearance of many well-built structures across the country, among them being staunchly constructed Hotel Borger, in Borger, Texas, embodying the utmost in fire-safety through the use of Lone Star Portland Cement in its reinforced concrete frame—highest standard of cement quality from foundation to roof.



NEARLY 60 FEET IN HEIGHT, 81 Drive In Theatre, on U. S. Highway 81, North Broadway, Wichita, is one of the tallest concrete masonry structures of its type in Kansas. Sixty thousand concrete block, made with Lone Star Air-Entraining Cement, were laid up with Lone Star Masonry Cement mortar, and the end result of good design, efficient workmanship and quality cement is an unusually attractive structure of maximum utility and economy.





"HOLDS ITS TEMPER like nobody's business," said the Masons who used Lone Star Masonry Cement mortar on well-designed Sacred Heart School and Gymnasium, Yonkers, N. Y. "No chopping and retempering on the board—works faster and easier—sticks to brick or block like a true friend—easier to tool, makes a neater job." In addition to exterior brick walls, Lone Star Masonry mortar was also used in exposed cinder-block walls in classrooms and corridors and for interior tile work as well.



THAT THE PEOPLE of Abilene, Texas, refer to the Radford Memorial Student Life Center at McMurry College as the "McMurry Masterpiece" is a tribute not alone to the excellence of its architectural design but to the attractive, expertly-handled brickwork as well. "This mortar really does spread like butter," said the Masons, in referring to the performance of Lone Star Masonry Cement on this outstanding building.



"**EASIEST WORKING MORTAR** a man ever put a trowel to," said the Masons on Sam Houston Elementary School, Odessa, Texas, the quality of whose work is evidenced by attractive brick walls, with the clean, smooth mortar joints which are always the mark of Lone Star Masonry mortar in the hands of the skilled craftsman.

HANDSOME FACE-BRICK WALLS laid up with Lone Star Masonry Mortar lend distinction to the appearance of the 120-bed addition to Beth-El Hospital, Brooklyn, N. Y., now one of the largest voluntary hospitals in the U. S. Typical of the many structures in which this uniformly high-quality mortar has proved its worth, in extra workability, finer appearance, and maintenance-free service over the years.





EAST INDIANOLA SCHOOL, North Topeka, Kansas, is another "all-star" Lone Star job—all brick, block, tile and glass block laid up with Lone Star Masonry Cement mortar—Lone Star Portland Cement in foundation, frame, pilasters, roof slab and cast-in-place decorative motifs.

THE TRIM, PLEASING, WELL-BUILT
appearance of the First Federal Savings & Loan Building, Lubbock, Texas, suggests friendly, up-to-date banking service. To achieve its clean, straight simplicity of line, a pleasing combination of Roman brick and white cast-stone, laid up with Lone Star Masonry mortar, was used to excellent effect.





FROM FOUNDATION TO ROOF, telephone buildings are designed with quality the sole arbiter, and a principal concern is to keep out moisture. With this in mind, Lone Star Masonry Cement was used in laying up all brick and block on the New York Telephone Company Building, at West New Brighton, Staten Island. During cold weather, 'Incor' 24-Hour Cement was used in concreting the frame; elsewhere, in foundations, frame, floors and roof, Lone Star Portland Cement was used. There is a Lone Star Cement for every construction need—assuring a single standard of highest quality throughout the building.



"YOU SURE CAN PUT 'EM TO BED with this mortar," said the Masons who laid up the eye-pleasing brick-work on the Hotel Lincoln, Odessa, Texas, in commenting on the performance of Lone Star Masonry Cement—the all-purpose mortar cement which makes it easier for the Mason to build attractive, weathertight walls — the primary aim and interest of every Architect, Contractor and Mason.

IV

REFERENCE TABLES for Estimating Quantities

Table I: BRICK AND MORTAR FOR 100 SQUARE FEET OF SOLID BRICK WALL

JOINT THICKNESS	1/4"	3/8"	1/2"	5/8"
4-INCH WALL				
8-INCH WALL				
Bricks—No.	698	655	616	581
Mortar—Cu. Ft.	4.0	5.7	7.2	8.6
Cu. Yd.	.148	.211	.267	.318
*Wt.—1 Sq. Ft. Wall—Lb.	33.6	34.0	34.2	34.6
12-INCH WALL				
Bricks—No.	2095	1965	1848	1742
Mortar—Cu. Ft.	20.3	25.3	29.9	34.0
Cu. Yd.	.752	.937	1.11	1.26
*Wt.—1 Sq. Ft. Wall—Lb.	111.4	112.4	113.4	114.1
16-INCH WALL				
Bricks—No.	2793	2620	2464	2322
Mortar—Cu. Ft.	28.5	35.1	41.4	46.7
Cu. Yd.	1.06	1.30	1.53	1.73
*Wt.—1 Sq. Ft. Wall—Lb.	150.1	151.0	152.9	153.9

Quantities are net—Allow for waste.

*Approximate wt. wall = No. Bricks x 4.1 lb. + Cu. Ft. Mortar x 125 lb.
Common brick 2 1/4" x 3 3/4" x 8". All joints filled.

Table II: BLOCK AND MORTAR FOR 100 SQUARE FEET OF BLOCK WALL

MATERIALS	CONCRETE BLOCK—Height x Length		
	7 5/8" x 15 5/8"	5" x 11 1/4"	3 5/8" x 15 5/8"
4-INCH WALL			
Blocks—No.	112.5	220	225
Mortar—Cu. Ft.	2.3	3.6	3.9
Cu. Yd.	.085	.133	.144
*Wt. 1 Sq. Ft. Wall—Heavy Agt.	28.5	30.0	30.5
—Lbs.	20.5	21.5	21.5
6-INCH WALL			
Blocks—No.	112.5	220	225
Mortar—Cu. Ft.	2.3	3.6	3.9
Cu. Yd.	.085	.133	.144
*Wt. 1 Sq. Ft. Wall—Heavy Agt.	43.5	45.0	45.5
—Lbs.	29.5	30.5	30.5
8-INCH WALL			
Blocks—No.	112.5	220	225
Mortar—Cu. Ft.	2.3	3.6	3.9
Cu. Yd.	.085	.133	.144
*Wt. 1 Sq. Ft. Wall—Heavy Agt.	55.0	56.5	57.0
—Lbs.	36.0	37.0	37.0
12-INCH WALL			
Blocks—No.	112.5	—	—
Mortar—Cu. Ft.	2.3	—	—
Cu. Yd.	.085	—	—
*Wt. 1 Sq. Ft. Wall—Heavy Agt.	79.5	—	—
—Lbs.	49.0	—	—

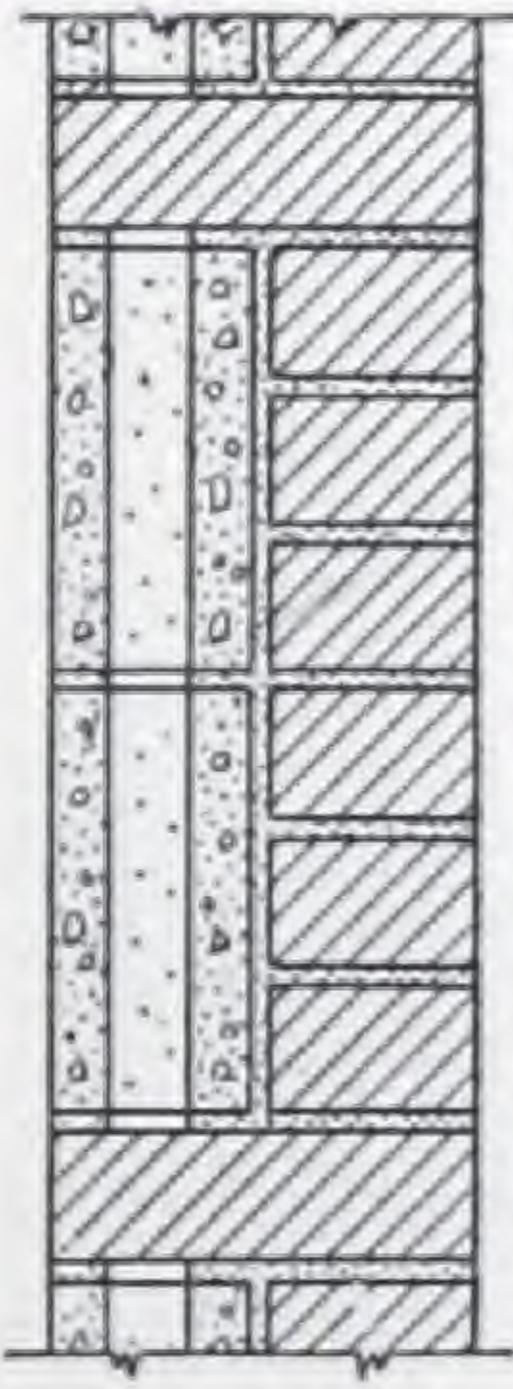
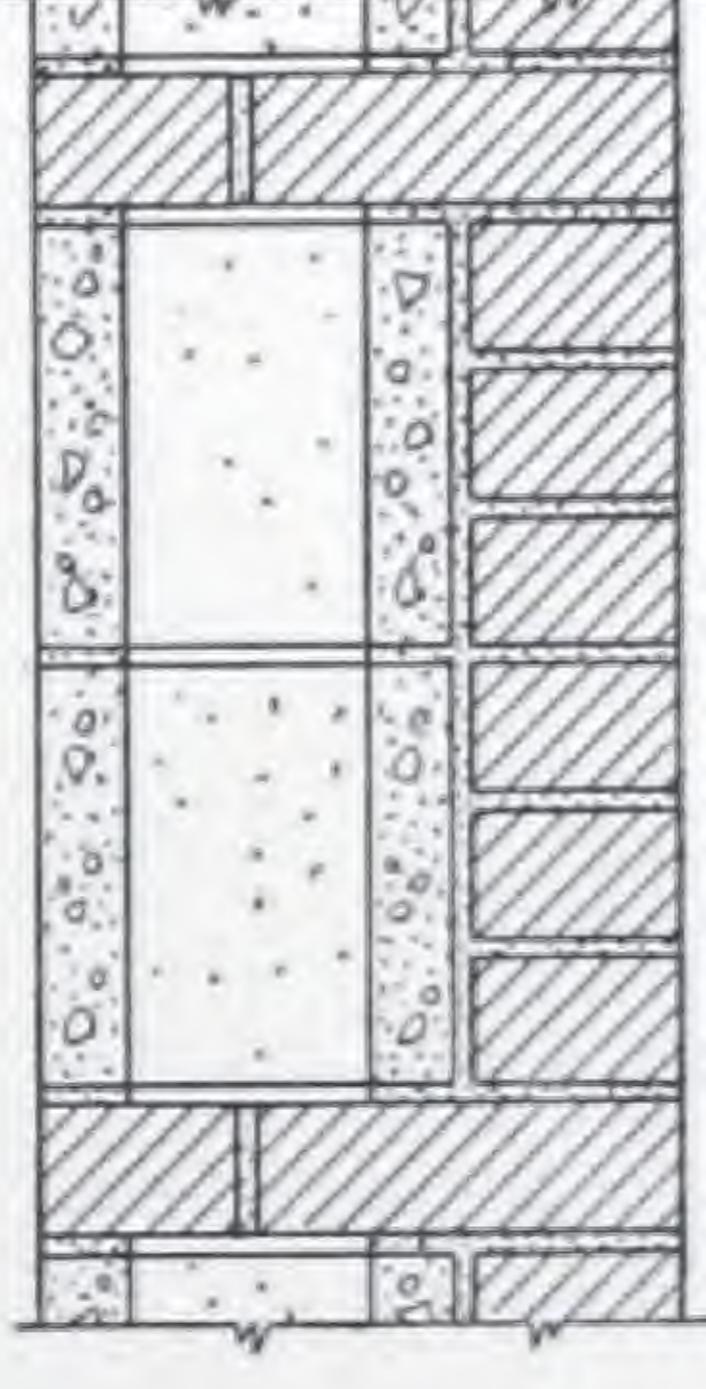
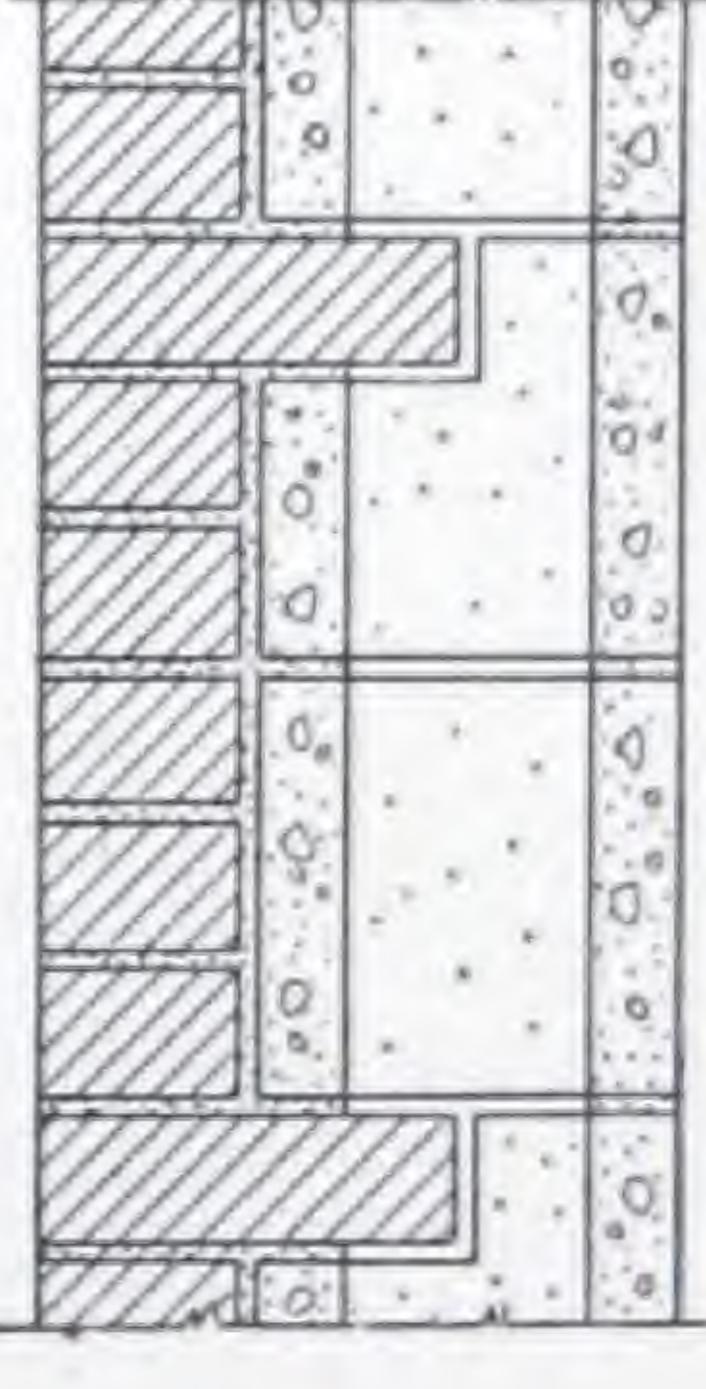
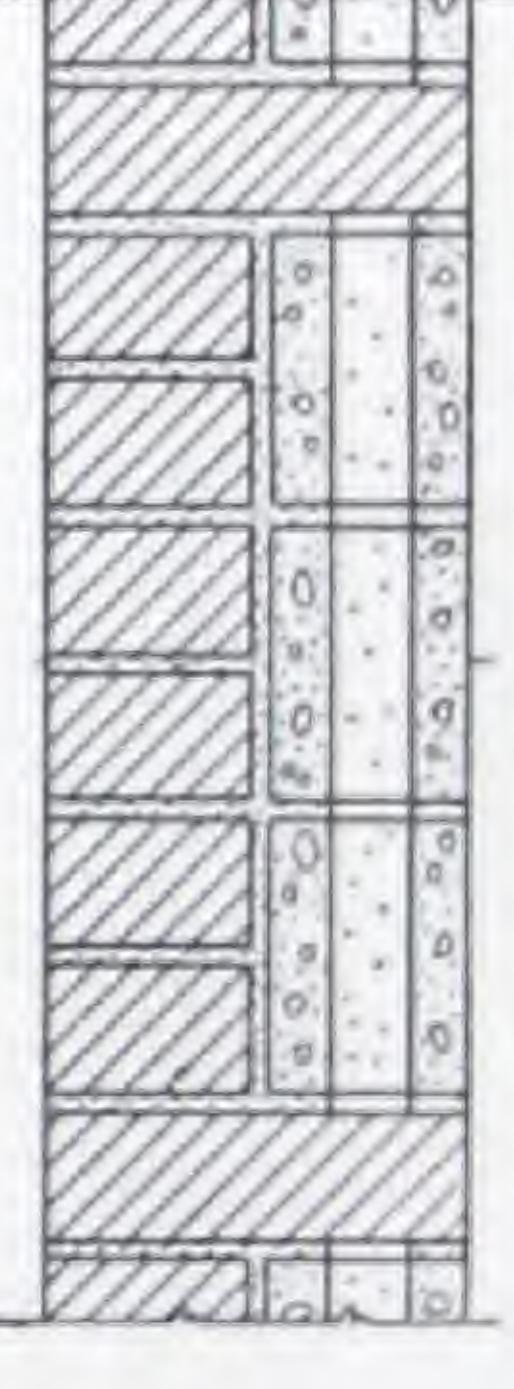
Quantities are net—Allow for waste.

Data based on 3/8-inch mortar joint, with face-shell bedding.

*Approx. wt. of wall = actual wt. single unit x no. units + 125 x cu. ft. mortar.

Actual wt. of wall with heavy agt. block usually within $\pm 7\%$ table value.Actual wt. of wall with light agt. block usually within $\pm 17\%$ table value.

Table III: QUANTITIES FOR 100 SQUARE FEET COMPOSITE WALL

BLOCK, BRICK AND MORTAR	WALL DETAIL AND MATERIALS			
	8-in. wall	12-in. wall	12-in. wall	8-in. wall
				
	7th course bonding	7th course bonding	6th course bonding	7th course bonding
Number of Stretcher Block	97 (4 x 8 x 16")	97 (8 x 8 x 16")	57 (8 x 8 x 16")	193 (4 x 5 x 12")
Number of Header Block	—	—	57 (8 x 8 x 16")	—
Number of Brick	772	868	788	770
Mortar* Cu. Ft. Cu. Yd.	11.2 .407	12.2 .452	12.2 .452	11.8 .438

*Mortar quantities based on 3/8-in. joints with face-shell bedding for the block. Quantities are net. Allow for waste.

Table IV: 1:3 MORTAR—QUANTITIES FOR 1000 BRICK—Size 2 $\frac{1}{4}$ x 3 $\frac{3}{4}$ x 8 in.

Sand Lb./Cu. Ft.		80		85		90		95	
Joint	Mortar Cu. Ft.	Cement Bags	Sand Cu. Yd.						
4-INCH WALL									
1/4"	5.7	1.9	.21	1.8	.20	1.7	.19	1.6	.18
3/8"	9.0	3.0	.33	2.8	.32	2.7	.30	2.6	.28
1/2"	11.7	3.9	.43	3.7	.41	3.5	.39	3.3	.37
5/8"	14.8	4.9	.55	4.7	.52	4.4	.49	4.2	.47
8-INCH WALL									
1/4"	8.7	2.9	.32	2.7	.31	2.6	.29	2.5	.27
3/8"	11.7	3.9	.43	3.7	.41	3.5	.39	3.3	.37
1/2"	15.1	5.0	.56	4.8	.53	4.5	.50	4.3	.48
5/8"	18.3	6.1	.68	5.8	.64	5.5	.61	5.2	.58
12-INCH WALL									
1/4"	9.7	3.2	.36	3.1	.34	2.9	.32	2.8	.31
3/8"	13.0	4.3	.48	4.1	.46	3.9	.43	3.7	.41
1/2"	16.3	5.4	.60	5.1	.57	4.9	.54	4.7	.51
5/8"	19.6	6.5	.73	6.2	.69	5.9	.65	5.6	.62
16-INCH WALL									
1/4"	10.2	3.4	.38	3.2	.36	3.1	.34	2.9	.32
3/8"	13.4	4.5	.50	4.2	.47	4.0	.45	3.8	.42
1/2"	16.8	5.6	.62	5.3	.59	5.0	.56	4.8	.53
5/8"	20.1	6.7	.74	6.3	.71	6.0	.67	5.7	.63
Unit H x L									
MORTAR QUANTITIES FOR 100 BLOCK									
8x16	2.1	.70	.078	.66	.074	.63	.070	.60	.066
5x12	1.5	.50	.056	.47	.053	.45	.050	.43	.047
4x16	1.6	.53	.059	.50	.056	.48	.053	.46	.050

Quantities are net—Allow for waste.

Brick data based on common brick, all walls solid with full bed and head joints. Block data based on 3/8-in. mortar joints.

Table V: LONE STAR MASONRY CEMENT AND SAND FOR ONE CUBIC YARD OF MORTAR

MIX, by volume	1:2	1:2 1/2	1:3	1:3 1/2	1:4	1:5
Sand at 80 lb. per cu. ft.*						
Cement, bags	12.8	10.6	9.0	7.9	6.8	5.6
Sand, cu. yds.	.94	.98	1.0	1.01	1.02	1.03
Mortar, cu. ft./bag	2.11	2.55	3.00	3.42	3.97	4.82
Sand at 85 lb. per cu. ft.						
Cement, bags	12.2	10.0	8.5	7.4	6.5	5.4
Sand, cu. yds.	.90	.93	.95	.96	.96	.97
Mortar, cu. ft./bag	2.21	2.70	3.17	3.65	4.15	5.00
Sand at 90 lb. per cu. ft.						
Cement, bags	11.6	9.5	8.1	7.0	6.2	5.0
Sand, cu. yds.	.86	.88	.90	.90	.91	.92
Mortar, cu. ft./bag	2.32	2.84	3.33	3.86	4.35	5.4
Sand at 95 lb. per cu. ft.						
Cement, bags	11.1	9.1	7.7	6.6	5.9	4.8
Sand, cu. yds.	.82	.84	.85	.86	.87	.88
Mortar, cu. ft./bag	2.43	2.97	3.51	4.09	4.58	5.62

Sand varies in weight. Table is based on 4 conditions assuming that 1 cu. ft. of damp loose sand contains 80, 85, 90 and 95 lbs. of dry sand and 1 bag of Lone Star Masonry cement equals 1 cu. ft. weighing 70 lbs.

*This weight is used in standard mortar tests—ASTM specification C270.

Table VI: LONE STAR MASONRY CEMENT STUCCO: Materials per 100 sq. ft.

Thickness in.	Mortar cu. ft.	MASONRY CEMENT—Sand Mixes by Loose Volumes*							
		1:2		1:2 1/2		1:3		1:3 1/2	
		Lone Star Masonry bags	Masonry Sand cu. ft.	Lone Star Masonry bags	Masonry Sand cu. ft.	Lone Star Masonry bags	Masonry Sand cu. ft.	Lone Star Masonry bags	Masonry Sand cu. ft.
1/4"	2.08	0.98	1.96	0.81	2.04	0.69	2.08	0.61	2.10
3/8"	3.12	1.47	2.95	1.22	3.05	1.04	3.12	0.92	3.15
1/2"	4.17	1.97	3.94	1.63	4.08	1.39	4.18	1.23	4.21
5/8"	5.21	2.46	4.92	2.04	5.10	1.74	5.22	1.53	5.25
3/4"	6.25	2.95	5.90	2.45	6.12	2.09	6.26	1.84	6.30
1"	8.33	3.93	7.87	3.26	8.15	2.78	8.34	2.45	8.40

Quantities are net—allow for waste.

*Table based upon 1 cu. ft. of damp loose sand containing 80 lbs. of dry sand.

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- In the final analysis, quality work depends upon skill at the mixing box and craftsmanship on the scaffold—and no craftsman takes greater pride in the quality of his workmanship than does the Mason.

By facilitating the work of the skilled Mason every step of the way, Lone Star Masonry Cement helps assure quality work with efficient job speed:



EXTRA SMOOTH, WORKABLE MORTAR: One cementing material instead of two means one less variable in proportioning, assuring plastic, workable mortar of utmost uniformity.



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MORTAR STAYS PLASTIC, so brick or block can be properly bedded, with good, full joints that are so important in strong, durable work.



SAVES TIME AND LABOR ON THE JOB: Sticks to brick or block with minimum droppage . . . high water retention means less retempering.



MORE TIME BEFORE STRIKING: Makes it easy to go header high before striking joints — those clean, smooth, watertight joints that are the good mason's hallmark.



ALL-PURPOSE MORTAR: For plaster and stucco, too, this highly workable mortar works like butter under the trowel, clings to brick, block or tile, forms dense, water-repellent coat.

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